As long as $V_m < V_{\text{th}}$:

$$\begin{aligned}
\frac{dG_E}{dt} &= -\frac{1}{\tau_E} G_E + \sum G_E^{\text{syn}}(t_i)\delta(t - t_i) \\
\frac{dG_I}{dt} &= -\frac{1}{\tau_I} G_I + \sum G_I^{\text{syn}}(t_i)\delta(t - t_i) \\
\frac{dG_B}{dt} &= -\frac{1}{\tau_B} G_B + \sum G_B^{\text{syn}}(t_i)\delta(t - t_i) \\
V_\infty &= \frac{V_{\text{rest}} + V_E G_E + V_I G_I + V_B G_B + G_{\text{gap}}}{1 + G_E + G_I + G_B + \text{sumgap}} \\
\frac{dV_m}{dt} &= -\frac{1}{\tau}(1 + G_E + G_I + G_B + \text{sumgap})(V_m - V_\infty) \\
\frac{dV_{\text{th}}}{dt} &= -\frac{1}{\tau_{\text{th}}}(V_{\text{th}} - V_{\text{th,rest}})
\end{aligned}$$

When $V_m \geq V_{\text{th}}$, activity spikes and

$$\begin{aligned}
V_m^+ &= V_{\text{rest}} \\
V_{\text{th}}^+ &= V_{\text{th}}^- + \Delta V_{\text{th}} \\
G_B^+ &= G_B^- + 1
\end{aligned}$$